



## 9th International Symposium on Mediterranean Pig

3 – 5th November 2016

# ANIMAL HEALTH BIOSAFETY and FOOD SAFETY

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In PORTUGAL

CONSUMPTION of pork meat      44,7 Kg/person/year

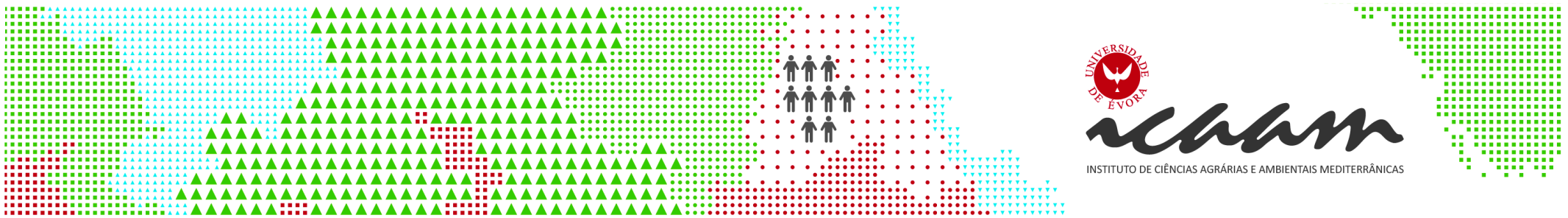
PRODUCTION      132 000 t transformed products

INE, 2016

In EUROPE

CONSUMPTION      40,9 Kg/person/year

EUROSTAT



# CHEMICAL HAZARDS

## ANIMAL PRODUCTION

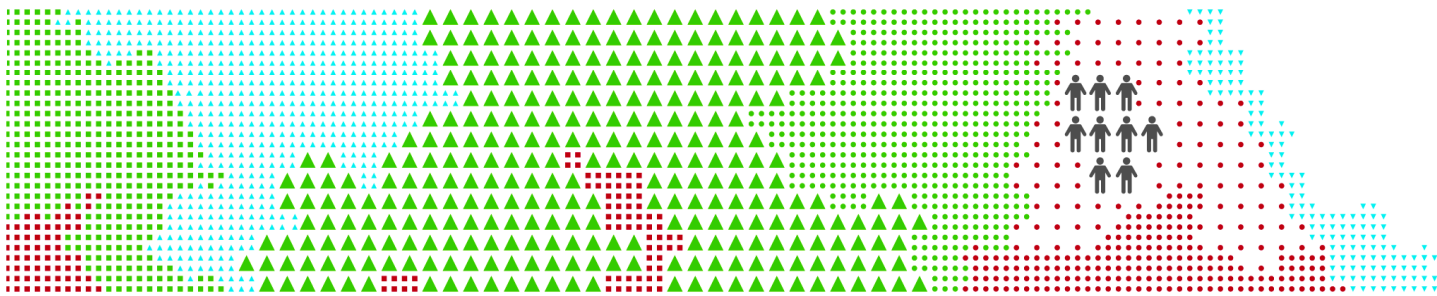


## PROCESSING



## FRESH MEAT

## MEAT PRODUCTS



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# CHEMICAL HAZARDS

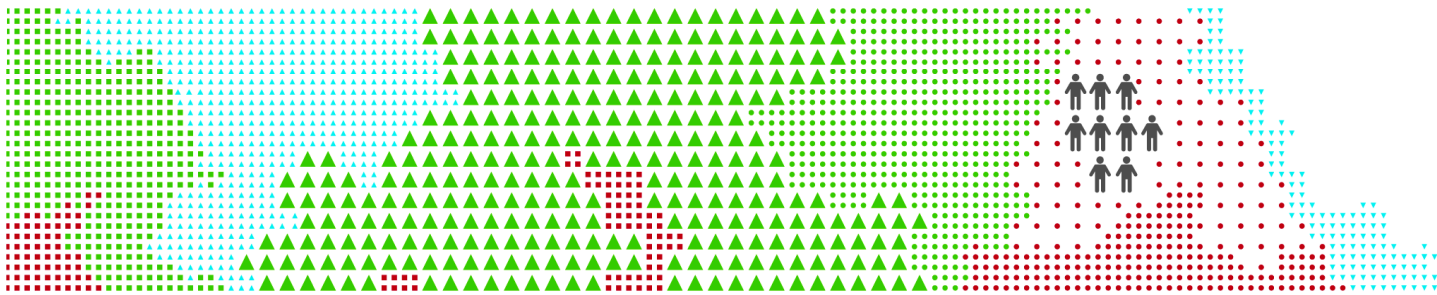
FRESH MEAT

PLANO NACIONAL DE PESQUISA DE RESÍDUOS  
PNPR 2011

1921 ANALYSED SAMPLES OF PORK MEAT

3 + ANTIMICROBIAL RESIDUES

SLAUGHTERHOUSE



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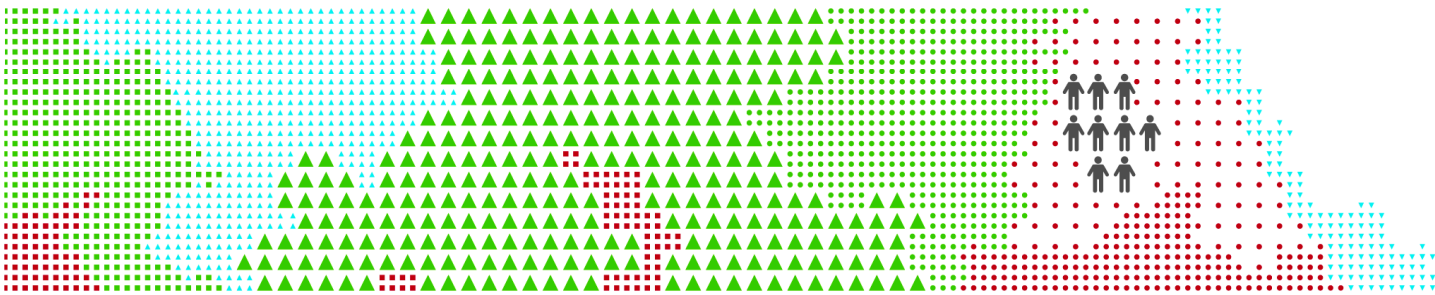
# CHEMICAL HAZARDS

## MEAT PRODUCTS

### PLANO NACIONAL DE COLHEITA DE AMOSTRAS PNCA 2013

30 ANALYSED SAMPLES OF PRODUCTS

2 + MINCED MEAT WITH SULFITES



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# CHEMICAL HAZARDS

## MEAT PRODUCTS

### PAIO DO ALENTEJO

### POLYCYCLIC AROMATIC HYDROCARBONS



n = 15

PAH 4                      48,8 – 55,6  $\mu\text{g/Kg}$

BaP                        1,0 – 1,06  $\mu\text{g/Kg}$

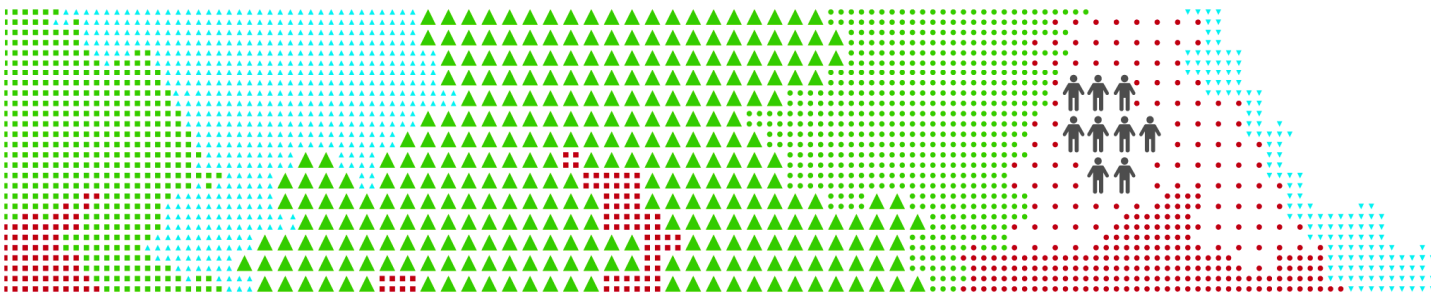
Elias et al., 2014

MRL

30,0  $\mu\text{g/Kg}$

5,0  $\mu\text{g/Kg}$

Reg (CE) 1881/2006



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# CHEMICAL HAZARDS

## MEAT PRODUCTS

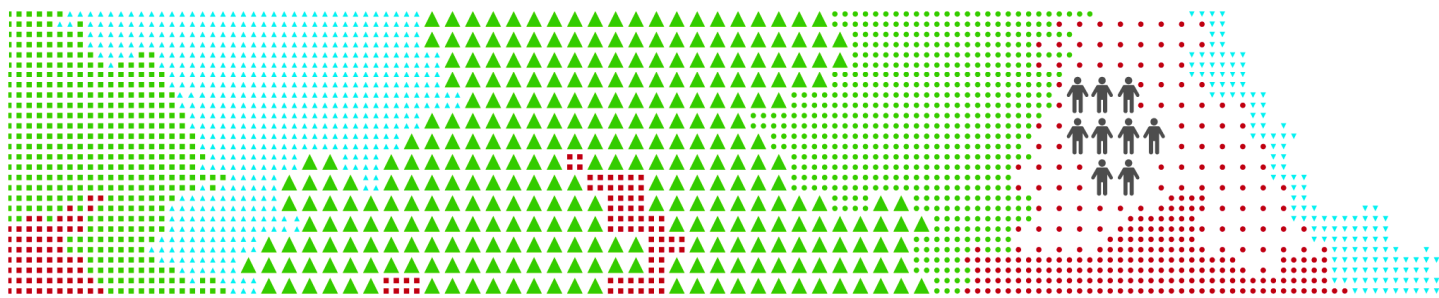
### BIOGENIC AMINES



PRODUCT n=18	Salsichão		Catalão		Chouriço preto		Paio preto	
SALT CONTENT	3%	6%	3%	6%	3%	6%	3%	6%
Vasoactive amines (mg/kg)	233,3	251,5	326,1	166,4	159,7	19,31	164,2	164,2
Histamine	15,02	9,04	ND	5,86	ND	ND	28,87	ND
Putrescine	24,6	ND	8,31	4,43	180,1	265,4	142,3	81,0
Cadaverine	577,9	83,3	178,4	103,4	364,8	ND	270,8	47,6

(Adapted from Laranjo et al., 2015; 2016a; 2017)

### SALT AND CURE EFFECTS



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# BIOLOGICAL HAZARDS

## ANIMAL PRODUCTION



## PROCESSING



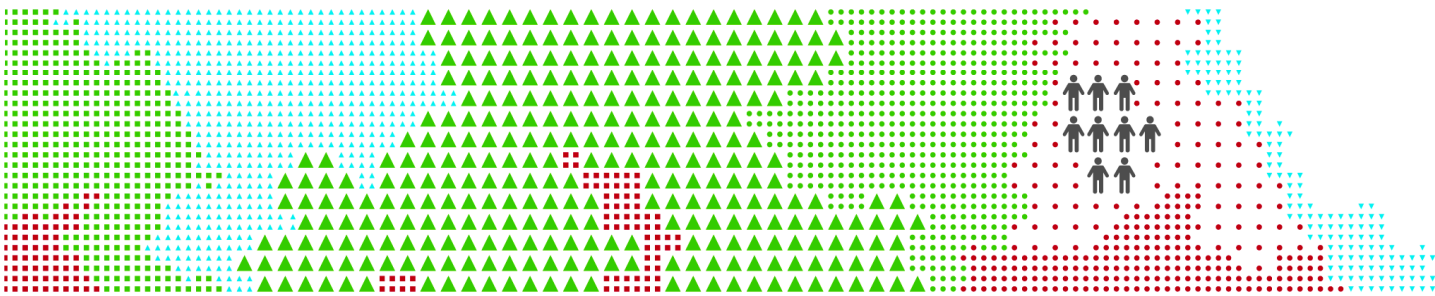
INFECTIONS

WITH SYMPTOMS OR NOT

MANIPULATION

CONTAMINATION

CROSS CONTAMINATION



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# BIOLOGICAL HAZARDS

*Toxoplasma gondii*

and

*Trichinella spiralis*

## BASED ON RISK ASSESSMENT

## FOOD CHAIN INFORMATION (FCI)

### LOW RISK HERDS

(Controlled housing)

Slaughter process

Chilled

### HIGH RISK HERDS

(Outdoor systems)

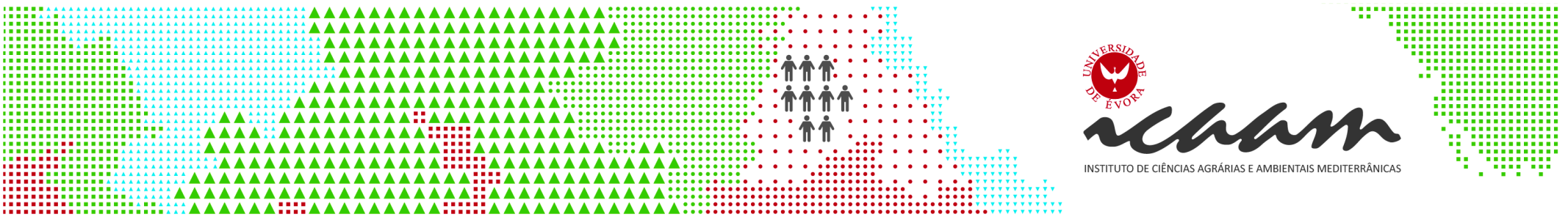
Slaughter process

Trichinella testing

Chilled

Toxoplasma &  
trichinella inactivation treatment

EFSA, 2011



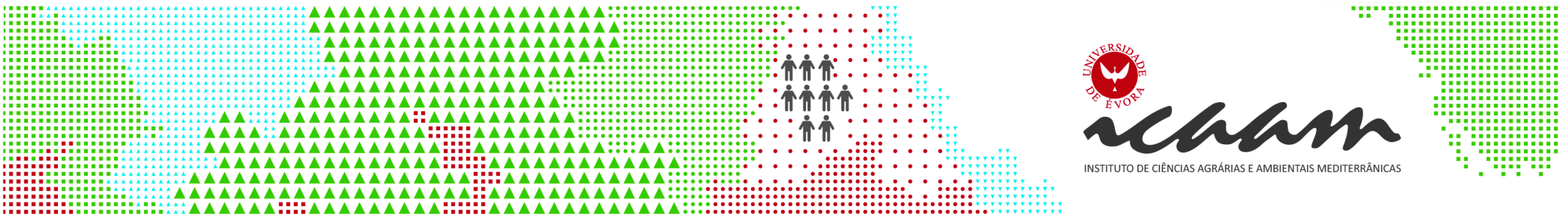
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# BIOLOGICAL HAZARDS

*Cysticercus cellulosae* / *Taenia solium*

No impact in EUROPE



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# BIOLOGICAL HAZARDS

## OCCURRENCE

### FRESH MEAT

*Salmonella* spp

12,6%

*Yersinia enterocolitica*

6,5%

### PORK MEAT PRODUCTS

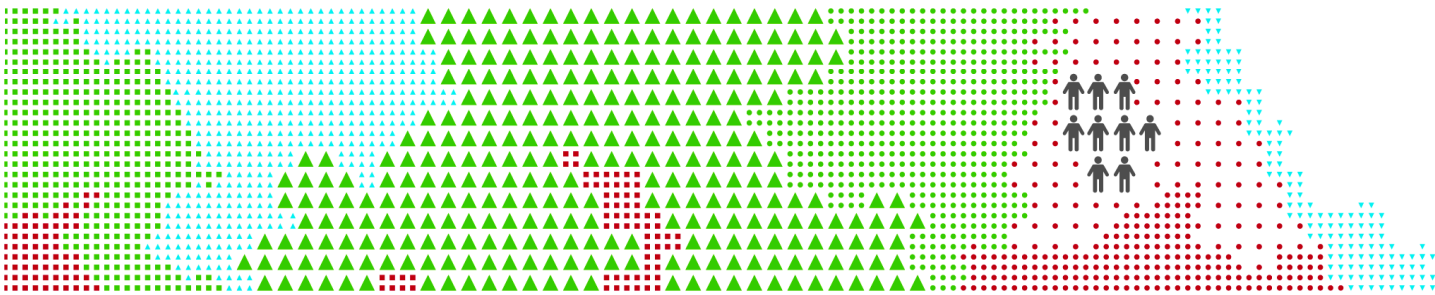
*Salmonella* spp

9,7%

*Listeria monocytogenes*

8,8%

Xavier et al., 2014



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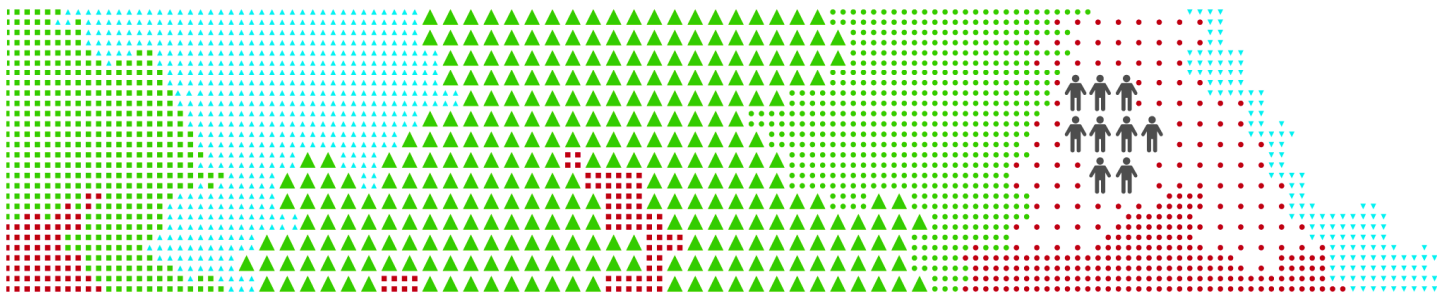


# BIOLOGICAL HAZARDS

## PLANO INSPECÇÃO DOS GÉNEROS ALIMENTÍCIOS 2015

PIGA

Product	Analysed samples	<i>Salmonella</i> sp	<i>Campylobacter</i> sp	<i>Listeria monocytogenes</i>
Fresh Pork Meat	66	6	4	0
Minced meat	51	6	0	0
Meat products	223	9	0	10



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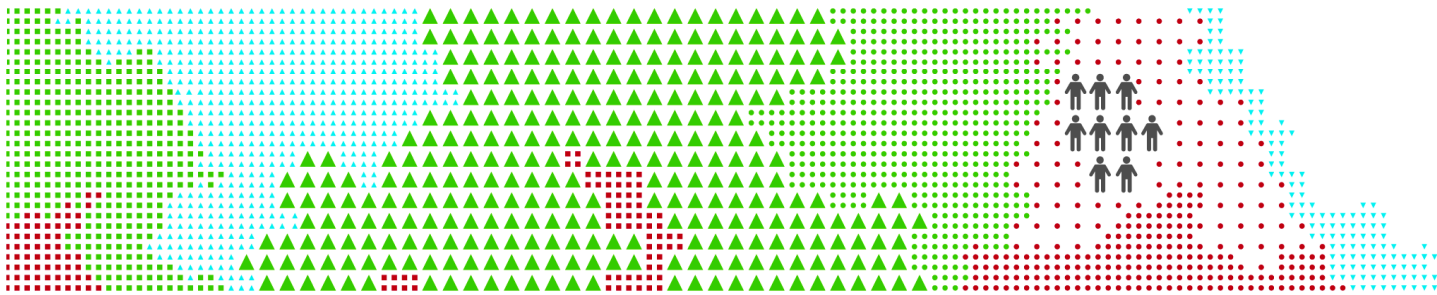


# BIOLOGICAL HAZARDS



	Catalão n=18	Salsichão n=18	Paio Preto n=18	Chouriço Preto n=18	Alheira n=27
<b><i>Salmonella</i> spp</b>	NEG	NEG	NEG	NEG	NEG
<b><i>Campylobacter</i> spp</b>	NEG	NEG	NEG	NEG	
<b><i>Listeria monocytogenes</i></b>	NEG	NEG	NEG	NEG	2 – 3 log CFU/g
<b><i>Escherichia coli</i></b>	< 2 log CFU/g	< 2 log CFU/g			3 – 4 log CFU/g

(Adapted from Dias et al., 2015; Elias et al., 2014; Laranjo et al., 2014; 2015; 2016a; 2017)



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# BIOLOGICAL HAZARDS

PAIO DO ALENTEJO and starter cultures

(Dias et al., 2015)

n = 90

*Salmonella* spp

*Listeria monocytogenes*

*Lactobacillus sakei*

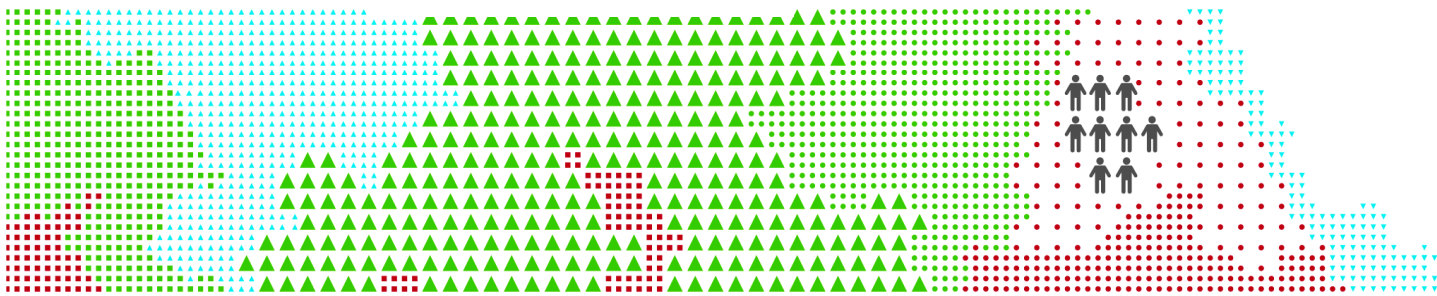
neg



CABEÇA DE XARA and vinegar

n = 48

*Listeria monocytogenes* counts lower with vinegar than control



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# BIOLOGICAL HAZARDS

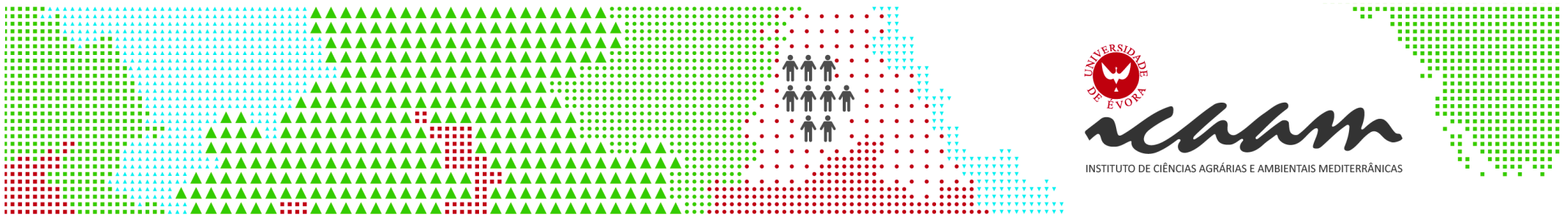
CARNE DO ALGUIDAR shelf-life in vaccum package RTE product

(Laranjo et al., 2016b)

n = 56

*Listeria monocytogenes*

not detected during shelf-life



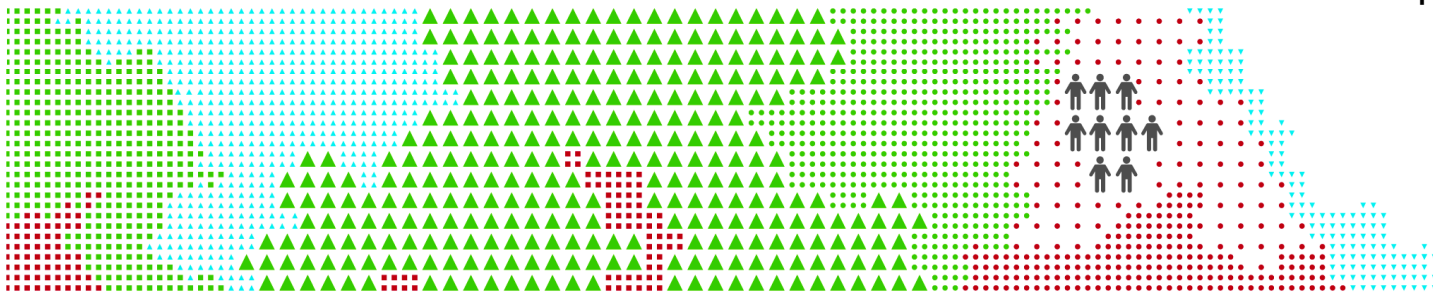


# BIOLOGICAL HAZARDS



n = 3	MINCING MACHINE	MIXING MACHINE	STUFFING MACHINE	WALL
<i>Salmonella</i> spp	Negative	Negative	Negative	Negative
<i>Listeria monocytogenes</i>	1 log CFU/cm <sup>2</sup>	Negative	Negative	Negative
<i>Escherichia coli</i>	Negative	Negative	Negative	2 log CFU/cm <sup>2</sup>

Adapted from Laranjo et al., 2014



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# FINAL CONSIDERATIONS

FEW CONTAMINATED PRODUCTS and LOW LEVELS OF CONTAMINATION

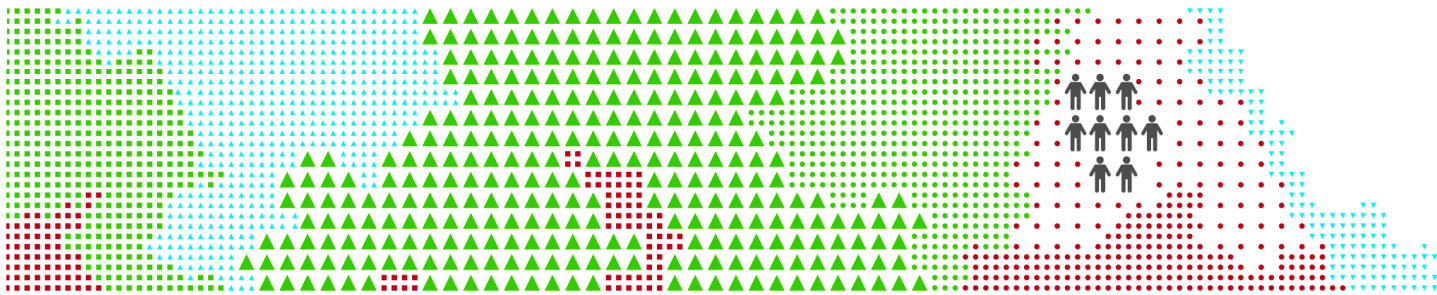
KEEP CONTROLLING HAZARDS

RAW MATERIAL SAFETY

GOOD HYGIENE PRACTICES

GOOD MANUFACTURING PRACTICES

INFORMATION TO CONSUMERS



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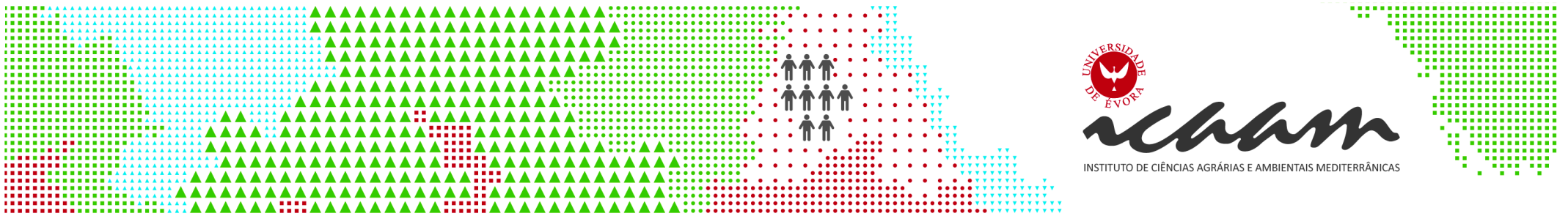


# NEW PRODUCTS

## NEW INGREDIENTS

## INNOVATIVE TECHNOLOGY

# TO INCREASE FOOD SAFETY



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# Further interest in our work

Please listen to the OC

by Igor Dias

by Marta Laranjo

in Session 5

and visit PO 1409

by Miguel Elias



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Thank you!

**FCT**

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PORTUGAL



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